

## Earnings of college graduates: women compared with men

*Among college graduates, women earned 73 percent as much as men in 1993; however, when earnings of women were compared with those of men in the same major field of study, at the same degree level, and in the same age group, about half of the women earned at least 87 percent as much as the men*

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Among college graduates aged 25 to 64, women's median annual earnings were 73 percent of men's in 1993. When median earnings of women are compared with those of men of a similar age and with similar levels of education, major fields of study, and occupational characteristics, however, the earnings gap narrowed progressively, although still spanning a wide range: in some cases, women earned nearly as much as, or even more than, men with the same characteristics, while in others, women earned much less. This article uses a 1993 National Science Foundation survey to examine the differences between the earnings of men and women graduates in order to answer the question, How much do women earn compared with men? The short answer to this question is that there are many answers to it: in some fields of study and occupations women do particularly well in relation to men, in others they do not fare so well, and in still others they are in between.

### Data and methodology

In 1993, the National Science Foundation surveyed a sample of 215,000 persons under age 75 who reported in the 1990 census that they had a bachelor's or higher degree as of April 1990.<sup>1</sup> Survey sampling rates varied by occupation reported. Data on earnings are considered statistically reliable for scientific and technical major fields of study with an employment of about

3,000 or more and for nonscientific majors with about 6,000 or more. This article includes only data at that level of reliability.

Earnings data from the survey were available only for full-time wage and salary workers. In some occupations, many graduates were self-employed. For these occupations, and for the majors leading to them, the earnings shown may differ from the earnings of all graduates as a whole, and the comparisons between women and men also may differ. Among the occupations most affected in this manner are psychologists; lawyers; writers, artists, and entertainers; salesworkers, except retail; health professionals; and architects.

To limit biases introduced by differences in the age distribution of women and men in specific fields of study, comparisons are made within three age groups: young (25–34), midcareer (35–44), and older (45–64) workers.<sup>2</sup> Earnings are analyzed separately for holders of bachelor's, master's, doctoral, and professional degrees, resulting in comparisons of men's and women's earnings by major field of study for 12 age and degree-level groups.<sup>3</sup> Data were collected for about 150 major fields or subfields of study, as well as 125 occupations. To meet statistical reliability requirements and make the presentation more manageable, some fields or subfields of study and some occupations were aggregated for the analysis presented in this article, reducing the number of fields analyzed to 29 and the number of occupations to 25. Therefore, observed differences in earnings between women and

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men by major field also may reflect different patterns of majors within each of the 29 groups. Similarly, differences in earnings within the 25 occupations may reflect differences in occupational patterns.<sup>4</sup>

The methodology used in this article is a variant of that used in many earlier studies;<sup>5</sup> however, the purpose of most of those studies was to calculate the effect of sex discrimination on earnings differences. The analyses examined numerous objective characteristics of women and men associated with earnings and showed how much of the observed earnings differences were attributable to the objective differences, with the remainder assumed to be the result of sex discrimination. By contrast, this article focuses only on two characteristics—major field of study and occupation—and controls for age and degree level. Data are presented so as to highlight the effects on earnings of women’s choices of field of study and occupation. Data using other characteristics covered in the National Science Foundation survey that might affect earnings are not examined. Accounting for these could explain more of the observed difference, or they might show that the data presented here understate differences between comparable groups of women and men.<sup>6</sup>

## Median earnings of women

*Median earnings of women compared with those of men of the same age group and degree level.*

Some of the differential in earnings between men and women can be accounted for by age and educational attainment. For example, women college graduates aged 25 to 64 had median annual earnings that were 73 percent as high as men’s—\$34,093, compared with \$46,605. In part, this earnings differential is caused by a higher proportion of working women than men being in the young age group and a lower proportion being in the older age group, where earnings tend to peak, reflecting returns to experience. Also, as the following tabulation of the percent distribution of men and women college graduates aged 25 to 64, by age and degree level, in 1993 shows, women were less likely than men to hold doctoral and professional degrees that tend to command high wages, but were more likely to hold master’s and bachelor’s degrees:

	Men	Women
Age:		
25–64 .....	100	100
25–34 .....	21	28
35–44 .....	37	37
45–64 .....	41	35
Degree level:		
All degrees .....	100	100
Bachelor’s degree .....	62	64
Master’s degree .....	24	30
Doctoral degree .....	5	3
Professional degree .....	9	4

Women’s median earnings were greater than 73 percent of men’s earnings in 9 of 12 comparisons, covering 78 percent of all women. Exceptions were midcareer professional-degree holders, 73 percent; older professional-degree holders, 67 percent; and older bachelor’s-degree holders, 65 percent. (See table 1.) Younger women’s earnings ranged from 79 percent to 85 percent of men’s, midcareer women’s from 73 percent to 82 percent, and older women’s from 65 percent to 80 percent.

*Median earnings of women compared with those of men with the same major field of study and of the same age group and degree level.*

When the major field of study was considered, women’s earnings were generally even closer to the earnings of men. For example, in all major fields taken as a whole, median earnings for young women graduates with a bachelor’s degree were 83 percent as much as the median for young men. Yet, in each of 23 major fields of study with statistically reliable data for both women and men, median earnings of women were more than 83 percent of men’s earnings. (See table 1.) Within all 12 age-and-degree-level groups, women’s earnings comparisons were greater than the comparisons for all major fields taken as a whole in 117 of 130 major fields, accounting for 96 percent of all employed women in these fields.<sup>7</sup>

The values of the 130 comparisons varied widely. Women’s median earnings were 100 percent or more of men’s in 11, but these had only 2 percent of women’s employment. In about half the comparisons (68, or 52 percent), accounting for almost half (48 percent) of employment in the 130 comparisons, women’s earnings were at least 87 percent of men’s. However, the proportion of the 130 comparisons meeting this criterion, and of women in these comparisons, varied by age group and by degree level, as shown in the following tabulation:

	Percent of comparisons	Percent of employment
Age:		
25 to 64 .....	52	48
25 to 34 .....	83	68
35 to 44 .....	47	42
45 to 64 .....	35	38
Degree level:		
All levels .....	52	48
Bachelor’s degree .....	49	35
Master’s degree .....	61	81
Doctoral degree .....	67	70
Professional degree .....	0	0

In general, the proportions of women earning 87 or more percent of men’s earnings increased with degree level, except for those with professional degrees, and decreased with age. Among older women with a bachelor’s degree, 23 percent of comparisons met the 87-percent criterion, but these cases included only 8 percent of the women.

**Table 1. Median earnings of women as a percent of men's earnings and percent distribution of employment, by major field of study, degree level, and age group, 1993**

Major field of study and degree level	Age 25-34				
	Median annual earnings		Women's earnings as percent of men's in same major	Percent distribution <sup>1</sup>	
	Women	Men		Women	Men
<b>Bachelor's degree</b>					
All major fields .....	\$29,660	\$35,694	83	100.0	100.0
Accounting .....	35,744	39,097	91	7.7	7.8
Agriculture .....	28,177	31,830	89	1.1	2.3
Architecture/environmental design .....	31,370	33,048	95	.5	1.1
Biological/life sciences .....	29,401	33,129	89	2.9	—
Business, except accounting .....	30,163	34,938	86	21.1	26.3
Chemistry .....	34,506	35,398	97	.6	.8
Communications .....	27,317	30,768	89	7.2	5.0
Computer and information sciences .....	38,966	41,314	94	3.6	6.0
Criminal justice/protective service .....	26,037	29,401	89	1.2	1.7
Economics .....	33,597	36,656	92	1.3	2.1
Education, including physical education .....	24,276	26,366	92	13.0	3.7
Engineering .....	43,274	43,518	99	2.6	14.5
Engineering-related technologies .....	36,300	38,688	94	.3	3.3
English language and literature .....	27,388	28,503	96	3.0	1.4
Foreign languages and linguistics .....	29,079	28,832	101	1.2	.4
Health/medical technologies .....	32,526	—	—	.9	—
History .....	25,989	30,418	85	1.1	1.7
Liberal arts/general studies .....	30,672	31,386	98	1.2	.8
Mathematics .....	35,052	36,828	95	1.3	1.7
Nursing .....	35,923	—	—	4.7	—
Pharmacy .....	47,506	48,979	97	.5	.5
Political science and government .....	28,507	33,271	86	2.1	2.7
Psychology .....	26,339	30,657	86	4.3	1.7
Social work .....	23,333	—	—	1.3	—
Sociology .....	25,763	29,142	88	1.6	.8
Theology, philosophy, and religion .....	—	—	—	—	—
Visual and performing arts .....	24,643	25,633	96	5.1	3.3
<b>Master's degree</b>					
All major fields .....	33,461	42,359	79	100	100
Accounting .....	—	—	—	—	—
Agriculture .....	—	—	—	—	—
Architecture/environmental design .....	—	—	—	—	—
Biological/life sciences .....	32,296	25,468	127	2.3	1.5
Business, except accounting .....	43,697	49,066	89	19.3	33.2
Chemistry .....	—	—	—	—	—
Communications .....	32,214	—	—	2.3	—
Computer and information sciences .....	47,852	49,352	97	2.5	5.5
Economics .....	—	—	—	—	—
Education, including physical education .....	29,672	29,951	99	32.0	8.4
Engineering .....	45,824	47,407	97	2.7	18.4
English language and literature .....	—	—	—	—	—
Foreign languages and linguistics .....	—	—	—	—	—
History .....	—	—	—	—	—
Mathematics .....	39,455	44,319	89	.9	1.6
Psychology .....	29,517	29,477	100	4.2	2.1
Social work .....	30,025	31,203	96	4.8	.8
Sociology .....	—	—	—	—	—
Theology, philosophy, and religion .....	—	—	—	—	—
Visual and performing arts .....	28,382	29,361	97	2.8	2.5
<b>Doctoral degree</b>					
All major fields .....	36,285	42,860	85	100.0	100.0
Biological/life sciences .....	24,422	27,223	90	22.8	14.2
Chemistry .....	—	—	—	—	—
Education, including physical education .....	—	—	—	—	—
Engineering, mathematics, and computer science .....	—	—	—	—	—
English language and literature .....	—	—	—	—	—
Foreign languages and linguistics .....	—	—	—	—	—
Psychology .....	—	—	—	—	—
Sociology .....	—	—	—	—	—
<b>Professional degree</b>					
All major fields .....	40,357	48,320	84	100.0	100.0
Law .....	43,453	51,494	84	53.3	49.3
Medicine, including dentistry, optometry, osteopathy, podiatry, and veterinary .....	35,684	41,633	86	37.3	42.9

See footnotes at end of table.

**Table 1.** Continued—Median earnings of women as a percent of men's earnings and percent distribution of employment, by major field of study, degree level, and age group, 1993

Major field of study and degree level	Age 35-44				
	Median annual earnings		Women's earnings as percent of men's in same major	Percent distribution <sup>1</sup>	
	Women	Men		Women	Men
<b>Bachelor's degree</b>					
All major fields .....	\$32,155	\$43,200	74	100.0	100.0
Accounting .....	39,843	49,502	80	4.9	7.8
Agriculture .....	28,752	36,578	79	.8	2.4
Architecture/environmental design .....	46,356	42,602	109	.3	1.3
Biological/life sciences .....	34,245	41,179	83	3.7	3.8
Business, except accounting .....	34,638	44,867	77	10.6	23.0
Chemistry .....	37,501	44,994	83	.5	1.1
Communications .....	34,102	38,912	88	3.4	3.4
Computer and information sciences .....	43,757	50,510	87	1.4	2.7
Criminal justice/protective service .....	31,818	40,149	79	.8	1.5
Economics .....	49,175	49,378	100	-.6	1.8
Education, including physical education .....	27,988	34,470	81	24.5	7.0
Engineering .....	49,072	53,287	92	1.3	11.7
Engineering-related technologies .....	-	-	-	-	-
English language and literature .....	30,296	38,297	79	4.0	2.0
Foreign languages and linguistics .....	32,653	33,778	97	1.7	.4
Health/medical technologies .....	35,526	36,269	98	1.5	.3
History .....	30,553	38,095	80	1.8	2.8
Liberal arts/general studies .....	32,073	39,625	81	1.3	.8
Mathematics .....	37,534	51,580	73	1.6	1.8
Nursing .....	40,928	44,680	92	6.9	.4
Pharmacy .....	48,428	50,480	96	.7	.9
Political science and government .....	31,759	41,023	77	1.4	2.4
Psychology .....	32,301	40,718	79	4.4	3.1
Social work .....	28,593	32,174	89	2.1	.4
Sociology .....	29,532	37,250	79	3.1	1.7
Theology, philosophy, and religion .....	25,787	31,849	81	.4	1.4
Visual and performing arts .....	29,604	32,969	90	5.8	3.5
<b>Master's degree</b>					
All major fields .....	37,579	49,770	76	100.0	100.0
Accounting .....	50,053	58,435	86	1.1	2.3
Agriculture .....	33,422	42,145	79	.6	.9
Architecture/environmental design .....	45,063	44,515	101	.5	1.5
Biological/life sciences .....	38,695	40,822	95	1.7	1.6
Business, except accounting .....	51,809	60,386	86	11.3	29.9
Chemistry .....	-	-	-	-	-
Communications .....	39,417	53,013	74	1.4	1.3
Computer and information sciences .....	51,273	57,274	90	1.8	3.8
Economics .....	38,261	49,955	77	.4	.7
Education, including physical education .....	35,128	39,237	90	43.7	17.8
Engineering .....	54,380	59,404	92	1.3	10.9
English language and literature .....	35,412	34,159	104	1.5	1.1
Foreign languages and linguistics .....	34,716	-	-	.9	-
History .....	-	-	-	-	-
Mathematics .....	31,902	51,773	62	1.0	1.2
Psychology .....	34,747	38,670	90	4.7	2.8
Social work .....	33,993	40,064	85	4.1	1.6
Sociology .....	-	-	-	-	-
Theology, philosophy, and religion .....	31,487	30,400	104	1.0	4.8
Visual and performing arts .....	30,523	35,058	87	2.8	2.8
<b>Doctoral degree</b>					
All major fields .....	43,384	52,991	82	100.0	100.0
Biological/life sciences .....	40,661	49,271	83	17.1	14.4
Chemistry .....	59,173	62,706	94	3.8	9.1
Education, including physical education .....	41,824	47,807	87	16.3	7.8
Engineering, mathematics, and computer science .....	62,995	62,194	101	4.7	17.6
English language and literature .....	-	-	-	-	-
Foreign languages and linguistics .....	-	-	-	-	-
Psychology .....	44,889	55,155	81	16.0	8.3
Sociology .....	-	-	-	-	-
<b>Professional degree</b>					
All major fields .....	59,536	82,017	73	100.0	100.0
Law .....	57,182	70,164	82	53.2	45.2
Medicine, including dentistry, optometry, osteopathy, podiatry, and veterinary .....	81,227	100,610	81	34.2	44.0

See footnotes at end of table.

**Table 1.** Continued—Median earnings of women as a percent of men's earnings and percent distribution of employment, by major field of study, degree level, and age group, 1993

Major field of study and degree level	Age 45-64				
	Median annual earnings		Women's earnings as percent of men's in same major	Percent distribution <sup>1</sup>	
	Women	Men		Women	Men
<b>Bachelor's degree</b>					
All major fields .....	\$32,093	\$49,392	65	100.0	100.0
Accounting .....	35,254	54,745	64	3.4	8.7
Agriculture .....	—	—	—	—	—
Architecture/environmental design .....	—	—	—	—	—
Biological/life sciences .....	32,715	43,260	76	2.6	2.5
Business, except accounting .....	33,613	50,897	66	7.3	24.5
Chemistry .....	36,671	52,149	70	.9	1.8
Communications .....	37,418	49,985	75	1.5	1.9
Computer and information sciences .....	36,336	51,945	70	.6	.8
Criminal justice/protective service .....	—	—	—	—	—
Economics .....	42,743	52,264	82	1.5	.8
Education, including physical education .....	30,010	38,313	78	34.8	7.6
Engineering .....	38,707	59,215	65	.5	14.4
Engineering-related technologies .....	—	—	—	—	—
English language and literature .....	31,740	43,193	73	6.3	2.0
Foreign languages and linguistics .....	32,840	37,851	87	2.6	.6
Health/medical technologies .....	36,038	37,448	96	1.4	.2
History .....	30,283	42,321	72	2.5	3.3
Liberal arts/general studies .....	36,807	43,213	85	1.5	.8
Mathematics .....	34,718	56,389	62	2.2	2.8
Nursing .....	40,908	—	—	6.3	—
Pharmacy .....	46,148	51,028	90	.5	1.5
Political science and government .....	32,255	49,920	65	1.2	2.4
Psychology .....	32,076	45,514	70	3.2	2.3
Social work .....	28,953	30,205	96	1.5	.2
Sociology .....	32,039	45,757	70	3.7	1.8
Theology, philosophy, and religion .....	33,592	30,516	110	.6	1.8
Visual and performing arts .....	30,013	36,441	82	5.0	2.1
<b>Master's degree</b>					
All major fields .....	39,864	51,274	78	100.0	100.0
Accounting .....	—	—	—	—	—
Agriculture .....	—	—	—	—	—
Architecture/environmental design .....	—	—	—	—	—
Biological/life sciences .....	35,270	43,694	81	1.5	2.1
Business, except accounting .....	53,703	63,881	84	5.1	24.1
Chemistry .....	43,304	62,830	69	.5	.7
Communications .....	42,651	48,091	89	.9	1.0
Computer and information sciences .....	50,733	64,455	79	.6	1.7
Economics .....	—	—	—	—	—
Education, including physical education .....	39,433	45,299	87	52.0	24.8
Engineering .....	51,144	67,623	76	.3	8.8
English language and literature .....	36,805	45,352	81	3.3	1.4
Foreign languages and linguistics .....	40,835	42,036	97	1.7	.6
History .....	37,523	47,256	79	.8	1.6
Mathematics .....	42,102	57,842	73	1.2	2.4
Psychology .....	38,223	43,764	87	5.0	3.1
Social work .....	38,397	42,153	91	5.2	1.9
Sociology .....	45,286	44,486	102	.6	.5
Theology, philosophy, and religion .....	28,249	31,615	89	1.5	5.0
Visual and performing arts .....	34,520	40,861	84	2.6	2.5
<b>Doctoral degree</b>					
All major fields .....	49,820	62,247	80	100.0	100.0
Biological/life sciences .....	57,253	64,814	88	8.6	9.7
Chemistry .....	—	—	—	—	—
Education, including physical education .....	49,138	56,479	87	34.3	14.0
Engineering, mathematics, and computer science .....	—	—	—	—	—
English language and literature .....	42,273	50,900	83	6.2	3.1
Foreign languages and linguistics .....	39,220	52,101	75	4.1	2.3
Psychology .....	51,306	57,221	90	14.5	7.2
Sociology .....	48,179	49,527	97	3.2	1.5
<b>Professional degree</b>					
All major fields .....	61,176	91,105	67	100.0	100.0
Law .....	59,359	85,993	69	51.0	46.0
Medicine, including dentistry, optometry, osteopathy, podiatry, and veterinary .....	85,825	107,575	80	28.5	43.5

See footnotes at end of table.

**Table 1.** Continued—Medium earnings of women as a percent of men's earnings and percent distribution of employment, by major field of study, degree level, and age group, 1993

<sup>1</sup> Because not all major fields of study are shown, percent distribution does not add to 100. The numbers of women and men constituting the 100 percent for all major fields at the four degree levels and in the three age groups are as follows. Bachelor's degree: age 25–34—1,729,000 women, 2,006,300 men; age 35–44—1,832,600 women, 2,918,300 men; age 45–64—1,536,400 women, 2,767,200 men. Master's degree: age 25–34—403,700 women, 427,200 men; age 35–44—913,000 women, 1,069,000 men; age 45–64—1,072,900 women, 1,461,500 men. Doctoral degree: age 25–34—23,700

women, 50,700 men; age 35–44—71,900 women, 181,000 men; age 45–64—114,000 women, 401,800 men. Professional degree: age 25–34—99,800 women, 197,500 men; age 35–44—141,400 women, 463,500 men; age 45–64—91,300 women, 532,800 men.

NOTE: Data are for full-time wage and salary workers only. Dashes indicate data or calculation not considered statistically reliable.

SOURCE: Tabulated by the Bureau of Labor Statistics from a National Science Foundation survey conducted by the Bureau of the Census.

In some comparisons, women earned much less than men. For example, among mathematics majors, older women with a bachelor's degree and midcareer women with a master's degree had median earnings only 62 percent as much as men's earnings in the same categories. Younger and midcareer women with a bachelor's degree in computer science engineering, foreign languages, all four health majors, visual arts, and the major field of theology, philosophy, and religion did particularly well in relation to men in those same fields. Women with master's degrees in biological/life sciences, business, and education also did relatively well. Within some fields of study, earnings comparisons varied significantly by degree level. For instance, midcareer women with a bachelor's degree in economics did quite well in comparison to midcareer men with the same degree, but those with a master's degree did poorly, in fact earning much less than women with a bachelor's degree in the subject.

In some majors, comparisons among women varied widely by age group. Older women with bachelor's degrees in four majors—engineering, mathematics, accounting, and chemistry—had earnings comparisons 25 percentage points or more below those of young women with bachelor's degrees in the same four majors. The reason is clear: among men, the earnings of older workers were much greater than those of younger workers, while among women, earnings of older workers were lower than those of younger workers in three out of the aforementioned four majors; only in chemistry were they higher, and even then, just slightly. In fact, in most cases, older women did less well relative to men than did younger women. This is due in part to “vintage” effects that may not be as strong among women in the younger cohort as they age. For example, older women are more likely than younger women to have delayed their entry into the full-time labor force and are less likely to have had the benefit of equal employment opportunity policies when they were young.<sup>8</sup>

Women do better when their major fields are taken into account because women's distribution of employment, by field of study, differs significantly from men's. (See table 1.) What is highly significant is that almost all of the major fields in which men were concentrated had above-average median earnings, while those majors in which women were concentrated were characterized by below-average medians. Men were more likely to have degrees in engineering; engineering

technology; computer science; architecture; mathematics; economics; theology, philosophy, and religion; and business, and women were more likely to have degrees in social work, psychology, nursing, medical/health technologies, physical therapy, and education. Notably, among midcareer workers with a bachelor's degree, 24.5 percent of women had majored in the below-average-paying field of education, compared with 7 percent of men. In contrast, only 1.3 percent of women, but 11.7 percent of men, were above-average-paid engineering graduates.

Among younger women, field-of-study patterns were more similar to men's. These patterns reflect women's dramatic shift into business, communications, computer science, and engineering majors and out of education and liberal arts majors (the latter, like education, also preparation for teaching in many cases) during the 1970s and 1980s.<sup>9</sup> Among bachelor's-degree graduates, only 10.7 percent of older, but 28.8 percent of younger, women had a degree in business—either in accounting or in some other business field—while the proportion of men remained unchanged with age, at a third. Younger women were still much more likely than men to have majored in education or social work, however, and much less likely to have majored in engineering or computer science.<sup>10</sup>

Because women were much more likely than men to have a low-paying major, such majors have a greater weight in earnings calculations for all women than for all men; and, correspondingly, high-earnings majors have a lesser weight. As noted earlier, women's calculations also tend to be somewhat more heavily weighted by younger workers and less heavily weighted by those with a doctoral or professional degree. When median earnings of women are compared with those of men of the same age group, degree level, and field of study, they are not weighted and therefore are closer to men's.

A simulation was developed to show what the median earnings for all women would have been if women had the same age, degree-level, and field-of-study distribution as men—that is, the same weights, but with earnings in each field-of-study, age, and degree-level group unchanged. In other words, women would be just as likely as men to have a high-paying or low-paying major, to be in the older or younger age group, and to have a professional or a bachelor's degree.<sup>11</sup> The resulting syn-

**Table 2.** Median earnings of women aged 35-44, as a percent of men's earnings, by major field of study, occupation, and degree level, and percent distribution of employment, by occupation, 1993

Major field of study, occupation, and degree level	Median annual earnings		Women's earnings as percent of men's in same major and occupation	Percent distribution <sup>1</sup>	
	Women	Men		Women	Men
<b>Bachelor's degree</b>					
All major fields of study .....	\$32,155	\$43,200	74	100.0	100.0
Accounting:					
All occupations <sup>2</sup> .....	39,843	49,502	80	4.9	7.8
Accountants, auditors, and other financial specialists ..	41,121	47,115	87	59.2	47.6
Clerical and administrative support occupations .....	22,961	31,284	73	7.1	2.6
Managers, executives, and administrators .....	49,265	57,800	85	15.5	27.1
Biological/life sciences:					
All occupations .....	34,245	41,179	83	3.7	3.8
Biological/life scientists .....	35,468	34,246	104	13.0	7.3
Health technologists and technicians .....	33,398	34,521	97	15.1	4.8
Managers, executives, and administrators .....	49,307	52,096	95	9.2	18.6
Business, except accounting:					
All occupations .....	34,638	44,867	77	10.6	23.0
Accountants, auditors, and other financial specialists ..	35,606	46,384	77	14.0	8.3
Buyers, management analysts, and other management-related occupations .....	35,208	42,199	83	9.5	9.5
Clerical and administrative support occupations .....	23,270	29,252	80	16.6	2.9
Computer occupations, excluding engineers .....	41,756	46,733	89	5.4	4.3
Managers, executives, and administrators .....	43,624	55,192	79	14.0	27.9
Personnel, training, and labor relations specialists .....	39,386	47,893	82	5.1	1.4
Sales and marketing occupations, except retail .....	40,377	48,456	83	17.3	22.6
Communications:					
All occupations .....	34,102	38,912	88	3.4	3.4
Artists, broadcasters, editors, public relations specialists, and writers .....	34,198	37,071	92	26.5	25.7
Managers and management-related occupations .....	42,149	47,120	89	17.2	24.4
Sales and marketing occupations, except retail .....	49,322	37,878	130	19.8	18.5
Computer and information sciences:					
All occupations .....	43,757	50,510	87	1.4	2.7
Computer occupations, excluding engineers .....	43,836	49,967	88	66.0	62.6
Engineers, including computer engineers .....	48,503	55,783	87	11.2	13.8
Education, including physical education:					
All occupations .....	27,988	34,470	81	24.5	7.0
Buyers, management analysts, and other management-related occupations .....	31,450	40,530	78	3.7	6.2
Computer occupations, excluding engineers .....	38,288	46,576	82	1.6	3.1
Teachers, elementary through grade 12 .....	28,189	30,626	92	50.5	32.4
Managers, executives, and administrators .....	35,134	48,431	73	4.8	11.2
Sales and marketing occupations, except retail .....	35,231	47,168	75	4.3	11.5
Engineering:					
All occupations .....	49,072	53,287	92	1.3	11.7
Engineers, including computer engineers .....	49,246	53,134	93	48.9	58.3
Mathematics:					
All occupations .....	37,534	51,580	73	1.6	1.8
Computer occupations, excluding engineers .....	45,766	52,411	87	29.4	33.0
Psychology:					
All occupations .....	32,301	40,718	79	4.4	3.1
Clerical, food and other services, and retail sales .....	25,984	30,658	85	20.1	12.5
Counselors and social workers .....	27,724	30,409	91	10.7	7.5
Managers, executives, and administrators .....	44,528	54,227	82	10.3	15.4
Social workers .....	27,908	30,866	90	9.6	5.8
Visual and performing arts:					
All occupations .....	29,604	32,969	90	5.8	3.5
Artists, broadcasters, editors, public relations specialists, and writers .....	32,174	39,004	82	19.6	21.7
Clerical, food and other services, and retail sales .....	25,375	27,766	91	19.9	11.7
Teachers, elementary through grade 12 .....	30,736	30,930	99	12.9	11.0
Managers, executives, and administrators .....	38,416	44,457	86	9.4	9.5

See footnotes at end of table.

**Table 2.** Continued—Median earnings of women aged 35–44, as a percent of men's earnings, by major field of study, occupation, and degree level, and percent distribution of employment, by occupation, 1993

Major field of study, occupation, and degree level	Median annual earnings		Women's earnings as percent of men's in same major and occupation	Percent distribution <sup>1</sup>	
	Women	Men		Women	Men
<b>Master's degree</b>					
All major fields of study .....	\$37,579	\$49,770	76	100.0	100.0
Biological/life sciences:					
All occupations .....	38,695	40,839	95	1.7	1.6
Biological/life scientists .....	42,126	40,391	104	22.5	33.7
Business, except accounting:					
All occupations .....	51,824	60,364	86	11.3	29.9
Accountants, auditors, and other financial specialists ..	51,575	57,319	90	18.1	16.8
Buyers, management analysts, and other management-related occupations .....	57,468	55,919	103	7.3	6.7
Computer occupations, excluding engineers .....	49,047	57,349	86	4.3	5.5
Managers, executives, and administrators .....	62,749	69,270	91	27.6	37.3
Sales and marketing occupations, except retail .....	59,854	63,427	94	11.5	13.3
Computer and information sciences:					
All occupations .....	51,273	57,274	90	1.8	3.8
Computer occupations, excluding engineers .....	49,164	55,340	89	49.7	53.6
Engineers, including computer engineers .....	55,868	61,167	91	21.5	24.7
Education, including physical education:					
All occupations .....	35,128	39,229	90	43.7	17.8
Counselors, educational and vocational .....	34,202	36,196	94	5.7	2.8
Teachers, elementary through grade 12 .....	34,511	38,169	90	67.2	49.8
Managers, executives, and administrators .....	41,731	44,876	93	7.7	23.0
Postsecondary teachers .....	30,144	33,297	91	2.2	4.6
Engineering:					
All occupations .....	54,380	59,382	92	1.3	10.9
Engineers, including computer engineers .....	55,597	58,407	95	54.8	64.4
Psychology:					
All occupations .....	34,747	38,620	90	4.7	2.8
Counselors and social workers .....	32,023	34,321	93	26.6	17.7
Social scientists .....	32,841	32,559	101	17.1	22.1
Social work:					
All occupations .....	33,993	40,033	85	4.1	1.6
Social workers .....	33,127	38,532	86	66.0	61.3

<sup>1</sup>The numbers constituting the 100 percent for all major fields of study at the bachelor's-degree level are 1,832,600 women and 2,918,300 men. At the master's-degree level, the numbers are 913,700 women and 1,069,000 men. In each of the major fields, the men's (women's) figure for all occupations is the percent of the total men (women) employed in all major fields of study; the men's (women's) figure for the separate suboccupations is the percent of the men's (women's) all-occupations figure in the major.

<sup>2</sup>Data for all occupations are from table 1.

NOTE: In occupations with few observations, several occupations were combined. Management-related occupations include two occupational groups: buyers, management analysts, and other management-related occupations; and personnel, training, and labor relations specialists. Data are for full-time wage and salary workers.

SOURCE: Bureau of the Census.

thetic distribution of women's earnings has a median of \$38,068, 82 percent of the \$46,605 earned by men. As was observed earlier, the actual women's median, \$34,093, is 73 percent of men's earnings. In other words, adjusting women's age, degree-level, and field-of-study distributions reduces the observed gap in earnings by about 9 percentage points, or approximately one-third.

*Median earnings of women compared with those of men with the same occupation and major.*

When occupation also was considered, women's median earnings generally were even closer to men's. To make the data more manageable, the analysis was limited to midcareer

bachelor's- and master's-degree graduates. Of the 26 bachelor's-degree field comparisons shown in table 1, 10 yielded statistically reliable occupational earnings; of the 16 master's combinations, 7 did. Together, the two degree levels produced a total of 49 major-field and occupation comparisons. (See table 2.) In 38 of these, women did better than in the all-occupation comparisons between women and men; these 38 comparisons accounted for 70 percent of women in the analysis. In one case, namely, holders of master's degrees in education who were employed as teachers, accounting for 20 percent of women in the analysis, women earned the same as did all women education majors.

The preceding comparisons spanned a wide range. In five



cases—bachelor's-degree communications majors employed as sales and marketing workers, master's-degree business majors employed as buyers, master's-degree psychology majors employed as social scientists, and biology majors at both levels employed as biologists—women earned more than men with the same occupation and major.

In some cases, adding the occupational comparison provided very different percentages. Earnings of the sales and marketing workers just noted, at 130 percent of men's earnings, were 42 percentage points above the earnings ratio for all women to all men communications majors, and the bachelor's-degree biologists' men-to-women's earnings ratio was 21 points above that of all biology majors as a whole. On the other hand, bachelor's-degree education majors employed as managers earned only 73 percent as much as men managers, 8 points below the 81 percent for all-women-to-all-men education majors. Women visual and performing arts majors employed as artists, broadcasters, editors, public relations specialists, and writers also had ratios 8 points lower than women in all occupations combined, and accounting majors employed as clerical workers were 7 points lower than women in all occupations combined.

Women generally did even better, when compared to men in the same occupation, because their occupational patterns, like their field-of-study patterns, differed so from men's. Women were less likely than men to be in occupations with above-average earnings, such as sales and marketing workers (except retail) or managers. (See table 2.) Women were more likely than men to be in occupations with below-average earnings, such as teachers, social workers, health technicians, retail sales workers, or clerical, food, and other service

workers. Among education majors with bachelor's degrees, women were less than half as likely to be managers as were men, and among master's-degree holders, women were only about a third as likely. At the bachelor's-degree level, women education majors were also much less likely to be in computer or sales and marketing occupations, but were more likely to be elementary-through-12th-grade teachers.

The differences in occupational patterns noted in this article probably reflect different preferences between men and women. However, the underrepresentation of women in some occupations may also reflect discrimination in hiring and, particularly in the case of managers, promotion. Also, as noted earlier, there may be "vintage" effects that do not fully carry over for younger women as they enter the mid-career group.<sup>12</sup>

THE CHOICE OF BOTH OCCUPATION AND MAJOR are significant factors in determining a person's earnings. Although women college graduates earned less than men did overall, the earnings gap lessens significantly in most cases when women are compared with men with similar educational backgrounds and similar occupations. This article has highlighted majors and occupations in which women do particularly well, or particularly poorly, in relation to men. Much of the difference between women's and men's earnings, however, is not explained by the data presented. More might be explained by accounting for other objective differences.<sup>13</sup> However, it was not the purpose of the article to do so, or to estimate the difference in men's and women's earnings due to past or existing discrimination in hiring and promotion or to lower pay for equal work. □

## Footnotes

<sup>1</sup> Individuals who received a bachelor's degree after April 1990 are not included. The survey is the largest one available that has collected detailed information about college graduates' employment characteristics, such as earnings and occupation, by major field of study.

<sup>2</sup> These ranges divide graduates with bachelor's degrees into fairly equal-sized groups. For those with advanced degrees, however, there are fewer in the younger group. The 25–34 age group has fewer workers aged 25 and 26, because the survey population included only individuals who had at least a bachelor's degree 3 years earlier, at the time of the 1990 census. As a result, the median earnings for this age group are biased upward. Graduates aged 65 and older are excluded, because they are often at least partially retired.

<sup>3</sup> Although the degree-level separations should account for most differences in the quantity of education received, data on college courses taken after achieving the highest degree were not considered. Therefore, those who, for example, had completed all requirements for the doctorate except a dissertation would generally show up as master's degree holders. On-the-job and other nonacademic training, for which there were few data, also may affect earnings.

<sup>4</sup> For example, education comprises 12 subfields plus an "other" category, including education administration, computer teacher education, counselor education, physical education, educational psychology, and elementary teacher education. Also, note that the occupational category of biological

and life scientists includes agricultural scientists, biochemists, biological scientists (for instance, botanists and zoologists), forestry or conservation scientists, medical scientists (excluding practitioners), biological and life science technologists and technicians, and an "other" category. Further, there may be differences between women and men in the types of courses taken, even within the same major field. (For a discussion of these differences and a more general discussion of differences in fields of study and occupations entered, see Clifford Adelman, "Lessons of a Generation: Education and Work in the Lives of the High School Class of 1972," *Women at Thirty-something: Paradoxes of Attainment* (San Francisco, Jossey-Bass, 1994), chapter 2, pp. 36–82.)

<sup>5</sup> See, for example, Alan S. Blinder, "Wage Discrimination: Reduced Form and Structural Estimates," *Journal of Human Resources*, Fall 1973, pp. 436–55; Ronald Oaxaca, "Male–Female Wage Differentials in Urban Labor Markets," *International Economic Review*, October 1973, pp. 693–703; Mary Corcoran and Greg J. Duncan, "Work History, Labor Force Attachment, and Earnings Differences between the Races and Sexes," *Journal of Human Resources*, Winter 1979, pp. 3–20; Thomas N. Daymont and Paul J. Andrisani, "Job Preferences, College Major, and the Gender Gap in Earnings," *Journal of Human Resources*, Summer 1984, pp. 408–28; and Barry Gerhart, "Gender Differences in Current and Starting Salaries: The Role of Performance, College Major, and Job Title," *Industrial and Labor Relations Review*, April 1990, pp. 418–31.

<sup>6</sup> Among the characteristics not examined, but potentially relevant, are

having children living at home, marital status, type of employer, type of industry, and geographic location. However, some data on earnings of midcareer bachelor's-degree women without children are presented in footnote 13. Other factors not included in the survey, such as grade-point average in school or hours worked per week, also may be related to annual earnings.

<sup>7</sup> The 130 fields included 83 percent of the 8.03 million women in the survey population.

<sup>8</sup> It is also possible to use data in table 1 to compare earnings of women, by major, to earnings of the median for all men at the same degree level in the same age group. Not surprisingly, women in well-paying majors such as engineering, pharmacy, and business administration (at the master's level) had median earnings greater than those of the median man, and women in education, social work, and other poorly paying majors had earnings much less than those of the median man.

<sup>9</sup> This shift occurred not only because of greater opportunities for women outside of traditional occupations, but also because of the sharp drop in the number of job openings in teaching during the early 1970s.

<sup>10</sup> For further discussion of this point, see Eric Eide, "College Major Choice and Changes in the Gender Wage Gap," *Contemporary Economic Policy*, April 1994, pp. 55–64.

<sup>11</sup> The weighting procedure, with an example using the distribution of midcareer workers with bachelor's degrees in education and engineering, cited several paragraphs earlier, is as follows. Midcareer women with bachelor's degrees in the high-paying field of engineering (median earnings of \$49,072) made up less than three-tenths of 1 percent of women college graduates, at all levels, while men in this category made up almost 2.8 percent of all men. Therefore, the earnings of each woman respondent with an engineering major were weighted by a factor of 9.63, increasing the percentage of these women engineering majors to almost 2.8 percent of all women. Midcareer women with bachelor's degrees in low-paying education (median earnings of

\$27,988) were about 5.6 percent of women college graduates, at all levels, while men in this category were only about 1.7 percent of all men. Therefore, the earnings of each woman respondent with an education major were weighted by a factor of .297, reducing the percentage of these women education majors to about 1.7 percent of all women. Earnings of women respondents with other majors and degree levels, and in other age groups, were similarly weighted.

<sup>12</sup> Most of the women who earned as much as, or more than, the median man with the same major were managers.

<sup>13</sup> For example, women's earnings, and therefore the comparisons with men, are clearly affected by having responsibility for children. For instance, midcareer bachelor's-degree women without children living at home earned \$34,293, while all midcareer women with bachelor's degrees had median earnings of \$32,155, 74 percent of men's earnings. (See table 2.) Thus, if the earnings of women without children, rather than all women, had been used, then the earnings of midcareer bachelor's-degree women would have been 80 percent. The issue is complex, however, because women without children may be more likely both to have majored in a high-paying field and to be employed in a high-paying occupation. Furthermore, although men's earnings are also affected by the presence of children, for men, having children living at home is associated with *higher*, and not lower, earnings. Furthermore, a question about the number of years of professional work experience was asked in the survey, and the responses might have been used in place of the age-group specification. However, due to respondents' problems interpreting "professional work experience," data on the detailed major field of study were not considered reliable. Nonetheless, a comparison of earnings ratios by age group with earnings ratios by years of professional experience showed only slightly higher ratios for young and midcareer women with bachelor's degrees, but a somewhat higher ratio for older women. This suggests that young and midcareer women had almost as much professional experience as men in the same category, but that older women did not.